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Dynamic Swarm LSTM for Drift-Resilient Time Series Forecasting.

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1 Aim

The aim of this project is to develop a machine learning-based system capable of predicting market trends by analysing historical financial time-series data. The project seeks to investigate how combining quantitative market data with qualitative textual information can enhance the accuracy and reliability of stock market predictions.

2 Background

3 Problem Definitions

-having a complex data like training to read trends or overhype news might overfit the

4 Project Description

Show down with a figure the proposed system .

4.1 Scope

The scope of your project.

4.2 Objective

The primary objective of this research is to design a drift-resilient forecasting framework that maintains high predictive accuracy despite continuous or abrupt changes in data distribution. To achieve this, the study pursues the following specific objectives:

1. Develop a LSTM Framework that extends the SISC concept using dynamic swarm intelligence principles [1]

2. Implement Selective Particle Retraining. (eg, start with 10 particle, if only 1 to 3 particle detect concept drift retrain that, if 4 particle detect concept drift retrain all and maybe incorporate adaptive swarm scaling)

3. Incorporate adaptive Swarm Scaling. By enable dynamic adjustment of swarm size in proportion to drift severity to balance exploration and efficiency (can it be done?)

4. Evaluate Drift resilience and forecasting performace. By assessing the model accuracy, recovery time, retraining time and stability under varioius drift scenarious using real world and synthetic dataset.

5. Compare against baselines model. By comparing traditional LSTM model that does not have concept drift, compare with PSO-ELM model done by [1]

4.3 Task Breakdown

1. **Step 1: Research and Data Preparation**

   - Conduct literature review on stock market prediction models
   - Collect historical financial data from reliable sources
   - Collect historical news data from social media

4.4 Research Question

5 Similar System Information

Dynamic Swarm Intelligence for Time Series Concept Drift

1. Motivation of this work (Why the researchers do it) To build a time series forecasting system taht stays accurate even wehn the data change over time(concept drift)

2. The main problem statement of the work. Traditional forecasting models assume the data distribution is stationary. But in real life patterns evolve so a model trained on old data become outdated. The paper proposes a dynamic swarm intelligence approach (SISC) to detect adapt, adn reuse models automatically when drift happen.

3. How the researchers contributed to solve the problem 3 main idea of SISC. SISC-D is drift detection, teh system constantly monitor the performacne of the forecastin gmodel, if the error increses sharply, that's a signal that the data distribution may have changed.

4. What main results the researchers reach.

5. How do you think this paper you read is important for you.

5.1 Question

1.

6 References

References

[1] G. H. Oliveira, G. G. Cabral, A. C. Oliveira, M. G. Oliveira, L. L. Minku, and A. L. Oliveira, "Dynamic swarm intelligence for time series forecasting in the presence of concept drift," *SN Computer Science*, vol. 6, no. 6, p. 695, 2025.